WHAT IS CLAIMED IS:

1. A plasma display device comprising

a plasma panel and a driving circuit for driving said plasma panel,

said plasma panel being provided with a plurality of discharge cells,

each of said plurality of discharge cells comprising:

at least an X electrode and a Y electrode for producing a display discharge;

a dielectric film for covering said X electrode and said Y electrode at least partially;

a discharge gas filled in a discharge space; and

a phosphor for emitting visible light by being excited by ultraviolet rays produced by discharge of said discharge gas,

wherein

Vsemax is in a range of from 200 V to 1000 V,

where

Vsemax is a maximum of an absolute value of a voltage difference between said X electrode and said Y electrode during a display period when display-discharge pulses are applied to said X electrode and said Y electrode for producing said display discharge;

wherein

in said plasma panel, a display discharge region area ratio Ad satisfies

$0.05 \leqq Ad \leqq 0.4$,

where,

in said plasma panel,

a display surface is a surface from which visible light for display is irradiated,

a viewing space is a space into which the visible light for display is irradiated from said display surface,

a display space is a space containing said plurality of discharge cells arranged continuously,

a display region Rp is a projection of said display space onto said display surface,

Sp is an area of said display region Rp,

a display discharge space is a portion of said discharge space where said display discharge is produced,

a display discharge region is a projection of said display discharge space onto said display surface,

Rd denotes a collection of said display discharge regions in said display region Rp,

Sd is an area of said collection Rd; and

Ad = Sd/Sp; and

wherein

in at least some of said plurality of discharge cells, a ratio of an energy of light emitted from a non-display discharge region to an energy of white light is equal to or smaller than 0.2 when said white light is entered into said non-display discharge region from said viewing space,

where

a cell region is a projection of one of said plurality of discharge cells onto said display surface, and

a non-display discharge region is a portion of said cell region other than said display discharge region.

2. A plasma display device comprising

a plasma panel and a driving circuit for driving said plasma panel,

said plasma panel being provided with a plurality of discharge cells,

each of said plurality of discharge cells comprising:

at least an X electrode and a Y electrode for producing a display discharge;

a dielectric film for covering said X electrode and said Y electrode at least partially;

a discharge gas filled in a discharge space; and

a phosphor for emitting visible light by being excited by ultraviolet rays produced by discharge of said discharge gas,

wherein

Vsemax is in a range of from 200 V to 1000 V,

where

Vsemax is a maximum of an absolute value of a voltage difference between said X electrode and said Y electrode during a display period when display-discharge pulses are applied to said X electrode and said

Y electrode for producing said display discharge;

wherein

at least some of said plurality of discharge cells are provided with a black region in which a ratio of an energy of light emitted from a display surface to an energy of white light entered into said display surface is equal to or smaller than 0.2 when said white light is entered into said display surface from a viewing_space,

where

said display surface is a surface from which visible light for display is irradiated, and

said viewing space is a space into which the visible light for display is irradiated from said display surface,

wherein

a black region area ratio Ab satisfies the following inequality :

$$0.95 \geqq Ab \geqq 0.5,$$

where

a display space is a space containing said plurality of discharge cells arranged continuously,

a display region Rp is a projection of said display space onto said display surface,

Sp is an area of said display region Rp,

Rb denotes a collection of said black regions in said display region Rp,

Sb is an area of said black region collection Rb in said display surface, and

Ab = Sb/Sp.

3. A plasma display device comprising

a plasma panel and a driving circuit for driving said plasma panel,

said plasma panel being provided with a plurality of discharge cells,

each of said plurality of discharge cells comprising:

at least an X electrode and a Y electrode for producing a display discharge;

a dielectric film for covering said X electrode and said Y electrode at least partially;

a discharge gas filled in a discharge space; and

a phosphor for emitting visible light by being excited by ultraviolet rays produced by discharge of said discharge gas,

wherein

Vsemax is in a range of from 200 V to 1000 V,

where

Vsemax is a maximum of an absolute value of a voltage difference between said X electrode and said Y electrode during a display period when display-discharge pulses are applied to said X electrode and said Y electrode for producing said display discharge;

wherein

at least some of said plurality of discharge cells are provided with a black region of reflectance equal to or lower than $0.5 \times \beta$

max,

where, in said plasma panel,

a display surface is a surface from which visible light for display is irradiated, and

a viewing space is a space into which the visible light for display is irradiated from said display surface,

a reflectance is a ratio of an energy of light emitted from said display surface to an energy of white light entered into said display surface when said white light is entered into said display surface from said viewing space, and

βmax is a maximum of said reflectance in a respective one of said at least some of said plurality of discharge cells, and

wherein

a black region area ratio Ab satisfies the following inequality :

$$0.95 \geqq Ab \geqq 0.5,$$

where

a display space is a space containing said plurality of discharge cells arranged continuously,

a display region Rp is a projection of said display space onto said display surface,

Sp is an area of said display region Rp,

Rb denotes a collection of said black regions in said display region Rp,

Sb is an area of said black region collection Rb in said display

surface, and

Ab = Sb/Sp.

4. A plasma display device comprising

a plasma panel and a driving circuit for driving said plasma panel,

said plasma panel being provided with a plurality of discharge cells,

each of said plurality of discharge cells comprising:

at least an X electrode and a Y electrode for producing a display discharge;

a dielectric film for covering said X electrode and said Y electrode at least partially;

a discharge gas filled in a discharge space; and

a phosphor for emitting visible light by being excited by ultraviolet rays produced by discharge of said discharge gas,

wherein

Vsemax is in a range of from 200 V to 1000 V,

where

Vsemax is a maximum of an absolute value of a voltage difference between said X electrode and said Y electrode during a display period when display-discharge pulses are applied to said X electrode and said Y electrode for producing said display discharge;

wherein

an average reflectance β satisfies

$0.02 \leqq \beta \leqq 0.2$,

where, in said plasma panel,

a display surface is a surface from which visible light for display is irradiated,

a viewing space is a space into which the visible light for display is irradiated from said display surface,

a display space is a space containing said plurality of discharge cells arranged continuously,

a display region Rp is a projection of said display space onto said display surface,

a reflectance is a ratio of an energy of light emitted from said display region Rp to an energy of white light entered into said display region Rp when said white light is entered into said display region Rp from said viewing space, and

an average reflectance β is said reflectance averaged over said display region.

5. A plasma display device according to claim 1, wherein said driving circuit comprises a dc power supply for outputting a plurality of voltages including ground potential for forming said display-discharge pulses, and a switch circuit coupled between said dc power supply and said X and Y electrodes, and

Vsdc is in a range of from 200 V to 1000 V,

where Vsdc is defined as an absolute value of a voltage difference between maximum and minimum voltages of said plurality of voltages

outputted during said display period.

6. A plasma display device according to claim 2, wherein said driving circuit comprises a dc power supply for outputting a plurality of voltages including ground potential for forming said display-discharge pulses, and a switch circuit coupled between said dc power supply and said X and Y electrodes, and

Vsdc is in a range of from 200 V to 1000 V,

where Vsdc is defined as an absolute value of a voltage difference between maximum and minimum voltages of said plurality of voltages outputted during said display period.

7. A plasma display device according to claim 3, wherein said driving circuit comprises a dc power supply for outputting a plurality of voltages including ground potential for forming said display-discharge pulses, and a switch circuit coupled between said dc power supply and said X and Y electrodes, and

Vsdc is in a range of from 200 V to 1000 V,

where Vsdc is defined as an absolute value of a voltage difference between maximum and minimum voltages of said plurality of voltages outputted during said display period.

8. A plasma display device according to claim 4, wherein said driving circuit comprises a dc power supply for outputting a plurality of voltages including ground potential for

forming said display-discharge pulses, and a switch circuit coupled between said dc power supply and said X and Y electrodes, and

Vsdc is in a range of from 200 V to 1000 V,

where Vsdc is defined as an absolute value of a voltage difference between maximum and minimum voltages of said plurality of voltages outputted during said display period.

9. A plasma display device according to claim 1, wherein said discharge gas contains a Xe gas of a proportion aXe equal to or greater than 0.1,

where ng is a volume particle (atom or molecule) density of said discharge gas,

nXe is a volume particle density of said Xe gas, and

aXe = nXe/ng.

10. A plasma display device according to claim 2, wherein said discharge gas contains a Xe gas of a proportion aXe equal to or greater than 0.1,

where ng is a volume particle (atom or molecule) density of said discharge gas,

nXe is a volume particle density of said Xe gas, and

aXe = nXe/ng.

11. A plasma display device according to claim 3, wherein said discharge gas contains a Xe gas of a proportion aXe equal to or greater

than 0.1,

where ng is a volume particle (atom or molecule) density of said discharge gas,

nXe is a volume particle density of said Xe gas, and

aXe = nXe/ng.

12. A plasma display device according to claim 4, wherein said discharge gas contains a Xe gas of a proportion aXe equal to or greater than 0.1,

where ng is a volume particle (atom or molecule) density of said discharge gas,

nXe is a volume particle density of said Xe gas, and

aXe = nXe/ng.

13. A plasma display device according to claim 1, further comprising a plurality of barrier ribs, wherein said plurality of barrier ribs extend in approximately one direction, are arranged in a direction perpendicular to said one direction, and form part of said plurality of discharge cells, and

in at least some of said discharge cells, an average width of said plurality of barrier ribs averaged over a height thereof is 0.1 mm or more.

14. A plasma display device according to claim 2, further comprising a plurality of barrier ribs, wherein said plurality of

barrier ribs extend in approximately one direction, are arranged in a direction perpendicular to said one direction, and form part of said plurality of discharge cells, and

in at least some of said discharge cells, an average width of said plurality of barrier ribs averaged over a height thereof is 0.1 mm or more.

15. A plasma display device according to claim 3, further comprising a plurality of barrier ribs, wherein said plurality of barrier ribs extend in approximately one direction, are arranged in a direction perpendicular to said one direction, and form part of said plurality of discharge cells, and

in at least some of said discharge cells, an average width of said plurality of barrier ribs averaged over a height thereof is 0.1 mm or more.

16. A plasma display device according to claim 4, further comprising a plurality of barrier ribs, wherein said plurality of barrier ribs extend in approximately one direction, are arranged in a direction perpendicular to said one direction, and form part of said plurality of discharge cells, and

in at least some of said discharge cells, an average width of said plurality of barrier ribs averaged over a height thereof is 0.1 mm or more.

17. A plasma display device according to claim 1, further comprising a plurality of barrier ribs, wherein said plurality of barrier ribs extend in two directions intersecting each other in a grid pattern, and form part of said plurality of discharge cells, and in at least some of said discharge cells, an average width of said plurality of barrier ribs averaged over a height thereof is 0.1 mm or more in said plurality of barrier ribs extending in at least one of said two directions.

18. A plasma display device according to claim 2, further comprising a plurality of barrier ribs, wherein said plurality of barrier ribs extend in two directions intersecting each other in a grid pattern, and form part of said plurality of discharge cells, and in at least some of said discharge cells, an average width of said plurality of barrier ribs averaged over a height thereof is 0.1 mm or more in said plurality of barrier ribs extending in at least one of said two directions.

19. A plasma display device according to claim 3, further comprising a plurality of barrier ribs, wherein said plurality of barrier ribs extend in two directions intersecting each other in a grid pattern, and form part of said plurality of discharge cells, and in at least some of said discharge cells, an average width of said plurality of barrier ribs averaged over a height thereof is 0.1 mm or more in said plurality of barrier ribs extending in at least one

of said two directions.

20. A plasma display device according to claim 4, further comprising a plurality of barrier ribs, wherein said plurality of barrier ribs extend in two directions intersecting each other in a grid pattern, and form part of said plurality of discharge cells, and in at least some of said discharge cells, an average width of said plurality of barrier ribs averaged over a height thereof is 0.1 mm or more in said plurality of barrier ribs extending in at least one of said two directions.

21. A plasma display device according to claim 17, wherein an absolute value $|zY - zX|$ is 0.2 mm or more,
when a z axis is drawn in a direction of a height of said plurality of barrier ribs,
zX is a z-axis coordinate of said X electrode,
zY is a z-axis coordinate of said Y electrode.

22. A plasma display device according to claim 18, wherein an absolute value $|zY - zX|$ is 0.2 mm or more,
when a z axis is drawn in a direction of a height of said plurality of barrier ribs,
zX is a z-axis coordinate of said X electrode,
zY is a z-axis coordinate of said Y electrode.

23. A plasma display device according to claim 19, wherein an absolute value $|zY - zX|$ is 0.2 mm or more,

when a z axis is drawn in a direction of a height of said plurality of barrier ribs,

zX is a z-axis coordinate of said X electrode,

zY is a z-axis coordinate of said Y electrode.

24. A plasma display device according to claim 20, wherein an absolute value $|zY - zX|$ is 0.2 mm or more,

when a z axis is drawn in a direction of a height of said plurality of barrier ribs,

zX is a z-axis coordinate of said X electrode,

zY is a z-axis coordinate of said Y electrode.

25. A plasma display device according to claim 21, wherein a non-aperture-surface surface reflectance is 80% or more,

where

a solid wall surrounding said display discharge space is called an inner surface of said display discharge space,

a portion of said inner surface of said display discharge space from which the visible light for a display is emitted into said viewing space is called an aperture surface,

a portion of said inner surface of said display discharge space other than said aperture surface is called a non-aperture-surface,

said non-aperture-surface surface reflectance is defined as

a surface reflectance of said non-aperture-surface averaged over said non-aperture-surface.

26. A plasma display device according to claim 22, wherein a non-aperture-surface surface reflectance is 80% or more, where

a solid wall surrounding said display discharge space is called an inner surface of said display discharge space,

a portion of said inner surface of said display discharge space from which the visible light for a display is emitted into said viewing space is called an aperture surface,

a portion of said inner surface of said display discharge space other than said aperture surface is called a non-aperture-surface,

said non-aperture-surface surface reflectance is defined as a surface reflectance of said non-aperture-surface averaged over said non-aperture-surface.

27. A plasma display device according to claim 23, wherein a non-aperture-surface surface reflectance is 80% or more, where

a solid wall surrounding said display discharge space is called an inner surface of said display discharge space,

a portion of said inner surface of said display discharge space from which the visible light for a display is emitted into said viewing space is called an aperture surface,

a portion of said inner surface of said display discharge space other than said aperture surface is called a non-aperture-surface,

said non-aperture-surface surface reflectance is defined as a surface reflectance of said non-aperture-surface averaged over said non-aperture-surface.

28. A plasma display device according to claim 24, wherein a non-aperture-surface surface reflectance is 80% or more, where

a solid wall surrounding said display discharge space is called an inner surface of said display discharge space,

a portion of said inner surface of said display discharge space from which the visible light for a display is emitted into said viewing space is called an aperture surface,

a portion of said inner surface of said display discharge space other than said aperture surface is called a non-aperture-surface,

said non-aperture-surface surface reflectance is defined as a surface reflectance of said non-aperture-surface averaged over said non-aperture-surface.

29. An image display system employing a plasma display device according to claim 1.

30. An image display system employing a plasma display device according to claim 2.

31. An image display system employing a plasma display device according to claim 3.

32. An image display system employing a plasma display device according to claim 4.